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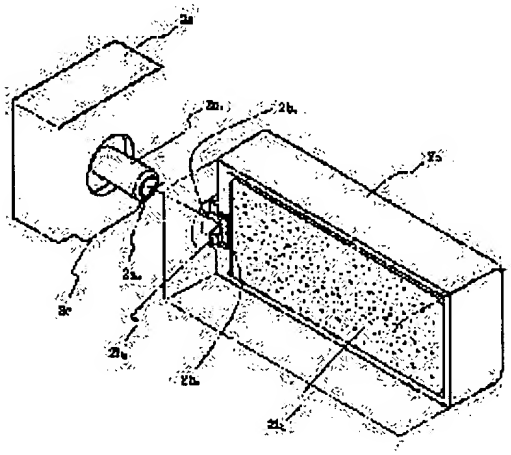
(54) INK JET RECORDING APPARATUS

(57)Abstract:

PURPOSE: To eliminate ink leakage by a method wherein an opening of an ink tank is constructed integral with the ink tank, and an ink supply port to a recording head is formed, penetrating the opening.

CONSTITUTION: When an ink supply tube 2a1 that supplies ink from an ink tank 2b to a recording head 2a is connected to an ink supply port 2b4 of the ink tank 2b, the ink supply tube 2a1 is made in the first place to contact with an opening 2b2. The opening 2b2 is formed integral with exterior mode of the ink tank 2b with a circular thin part provided, and is made breakable at this thin part. Then, the ink tank 2b is pressed against the recording head 2a, and the opening 2b2 is torn up at the thin part by the ink supply tube 2a1, and thereby the ink tank 2b is communicated with the recording head.



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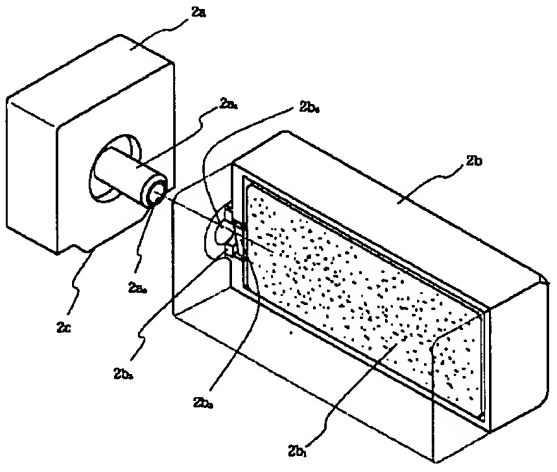
(54)【発明の名称】　インクジェット記録装置

(57)【要約】

【目的】　インクジェット記録装置において、インクタンクの密閉状態を長期間の保存においても十分に確保すること。

【構成】　インクタンクの供給口の蓋を、インクタンクと一体に構成する。



【特許請求の範囲】
【請求項１】　インクジェット記録装置において記録ヘッドと該記録ヘッドに連結して該記録ヘッドにインクを供給するインクタンクを具え、
該インクタンクの開口部をインクタンクと同部材の一体構成とし、該インクタンクの開口部を貫通することによって該記録ヘッドへのインク供給口が開かれることを特徴とするインクジェット記録装置。
【請求項２】　前記インクタンクの開口部は薄肉溝部を設け応力がかかるように構成することを特徴とする請求項１に記載のインクジェット記録装置。
【請求項３】　前記インクタンクの開口部のシール部材を該インクタンクと同部材の一体構成とすることを特徴とする請求項１または２に記載のインクジェット記録装置。
【請求項４】　前記インクタンクの開口部に結合する前記記録ヘッドの部分を径の異なるものとすることを特徴とする請求項１または２に記載のインクジェット記録装置。
【請求項５】　前記インクタンクの薄肉溝部に突起物を設け応力が高くなるよう構成した事を特徴とする請求項１～４に記載のインクジェット記録装置。
【発明の詳細な説明】
【０００１】
【産業上の利用分野】本発明は、記録ヘッドの吐出口からインクを吐出させ、これを被記録媒体に付着させて記録を行うインクジェット記録装置に関し、特にインクタンクが直接記録ヘッドに着脱するインクジェット記録装置に関する。
【０００２】
【従来の技術】近年パーソナルコンピュータやワードプロセッサにおいてはノート型もしくはラップトップ型といわれる小型軽量の可搬性に優れたものが提案されていて、プリンターもそれに対応した小型のものが求められている。そこでインクタンクが記録ヘッドと一体に形成されインクが無くなった場合には記録ヘッドごと交換する形態のインクカートリッジが提案されている。しかしこのカートリッジはインクタンクに比べて高価である記録ヘッドも同時に交換されるのでコストパフォーマンスが優れているとはいえなかった。この事をかんがみてインクタンク、記録ヘッドそれぞれが分離交換可能なインクカートリッジが提案されている。
【０００３】
【発明が解決しようとする課題】上記の分離交換型のインクカートリッジにおいてインク漏れ防止のためにインクタンク開口部を密閉しインク供給部挿入時初めて貫通する封止膜部材を設けた形態が提案されているが（特開昭６３－３９５９参照）、この場合、長期間の保存の際、封止膜とインクタンクとの接合部の接着剤が熱膨張や経時変化により密閉状態を保つことができないおそれがあった。
【０００４】本発明は上記従来技術の有する問題点にかんがみてなされたものであって、長期間の保存の際も、密閉状態を十分に確保することのできるインクカートリッジを提供することを目的とするものである。
【０００５】
【課題を解決するための手段】上記目的を達成するために、インクタンクの開口部をインクタンクと同部材の一体構成とし、インクタンクの開口部を貫通することによって記録ヘッドへのインク供給口が開かれることを特徴とするものである。
【０００６】また、開口部の縁に薄肉部分を形成し、応力がかかって貫通しやすい形態とする。
【０００７】
【実施例】本発明の実施例を図面に基づいて説明する。図３は本発明の実施例を適用したインクジェット記録装置を示す斜視図である。
【０００８】図３において、キャリッジ１には、記録ヘッド２ａとインクタンク２ｂとが連結したインクジェットカートリッジ２が搭載されている。このキャリッジ１の記録ヘッド２ａ側の一端部は、シャーシ３に回動自在に取り付けられたリードスクリュー４にその軸方向に摺動可能に嵌合され、キャリッジ１の他端部には、ガイド１ｂが配設されており、該ガイド　１ｂがシャーシ３に形成されたガイドレール３ｃにリードスクリュー４の軸方向と平行に摺動自在に嵌入されてキャリッジ１の姿勢が常に一定に保たれながらリードスクリュー４の回転に伴ってその軸方向に往復移動可能な構成となっている。
【０００９】前記リードスクリュー４は、その図示左側の一端に固着されたギヤ４ｂとキャリアモータ５の出力軸に固着されたクラッチギヤ５ａと歯合しキャリアモータ５の駆動により正転、逆転に伴ってリードスクリュー４に螺旋状に所定のピッチで形成されたリード溝４ａに嵌入する前記キャリッジ１に嵌入されたリードピン６によって前記キャリッジ１が往復駆動される。前記リードピン６は前記リードスクリュー４とのがたをなくすためにリードピンバネ７によりリードスクリュー４のリード溝４ａに付勢されている。
【００１０】前記記録ヘッド２ａの吐出口面２ｃに対向する記録用紙８の搬送は搬送ローラ９に圧接するピンチローラ１０によって前記記録用紙８を前記搬送ローラ９に圧接し前記搬送ローラ９を紙送りモータ１１により適宜回転させることにより印字部へ必要なだけ送られる。印字後は拍車１２と前記拍車１２に圧接する排紙ローラ１３により装置外へ排出される。前記搬送ローラ９及び排紙ローラ１３の駆動は紙送りモータ１１によって行われるが、その駆動力の伝達は前記紙送りモータ１１の軸に取り付けられたかさば歯車からなるモータピニオン１４、かさば歯車１５、ウォームローラ１６、搬送ホイール１７、排紙ホイール１８によって行われる。モータピ

ニオン１４の回転はかさば歯車１５によって回転方向が直角に変えられ平歯車部によってウォームローラ１６に伝えられる。ウォームローラ１６にはそのつば状の部分１６ａに渦巻状の平面ウォームが形成されていて（不図示）搬送ローラ１３の駆動はウォームローラ１６の円筒部１６ｂに形成された（不図示）ウォームが排紙ローラ駆動軸１９に取り付けられた排紙ホイール１８と歯合する事により行われる。

【００１１】前記拍車１２の位置は固定であり、前記排紙ローラ１３は前記拍車１２と排紙ローラ駆動軸１９との両方に押し当たるように排紙ローラホルダ２０の斜めの長穴２０ａによって保持され排紙ローラばね２１によって圧接されている。前記排紙ローラホルダ２０は排紙ローラ駆動軸１９を中心に回動するように支持されている。記録用紙８の搬送に際しては記録用紙８の厚さに応じて排紙ローラ１３が従動し記録用紙８の上面が拍車１２に突き当たって上下方向の位置が規制されるので図に示すように搬送する記録用紙８が厚くなることによって記録用紙８の表面と記録ヘッドの吐出口面２ｃの距離が短くなる量は排紙ローラ位置固定で拍車が動く場合（２点鎖線に示す）に比べ少なくて済む。

【００１２】回復装置２５は、記録ヘッド２ａの吐出口面２ｃをキャッピングするキャッピング部２５ｂと、該キャッピング２５ｂの内部を負圧にし、吐出口面２ｃから強制的に排出された排インクをキャッピング部２５ｂから吸引して排インク管２５ａに送り出すポンプユニット（ピストン、シリンダ等からなる公知のものでよい。）２５ｃと、前記キャッピング部２５ｂを吐出口面２ｃに対して前後移動させ、かつ、前記ポンプユニット２５ｃに駆動力を伝動するための公知のカム、歯車機構からなる伝動機構部２６（不図示）とから構成されている。前記伝動機構部２６には、キャリアモータ５の回転駆動力がクラッチギヤ５ａにより伝えられる。

【００１３】前記クラッチギヤ５ａは、スプライン溝などの回り止め手段が設けられてキャリアモータ５の出力軸にその軸方向に摺動可能に取り付けられており、スプリング（不図示）によりキャリッジ１の方向へ常に付勢されている。このクラッチギヤ５ａは、記録ヘッド２の吐出口面２ｃがキャッピング部２５ｂに向かい合う位置である回復位置にキャリッジ１が戻った際にキャリッジ１の図示の左側面により押圧されて前記スプリング５ｂの力に抗して移動し、前記伝動機構２６のタイミングギヤ２６ａと噛み合って該タイミングギヤ２６ａを回転させてキャリアモータ５の回転駆動力を伝動機構部２６に伝える。

【００１４】また、前記リードスクリュー４のリード溝４ａは、前記クラッチギヤ５ａがリードスクリュー４の回転駆動力を伝えている間、記録ヘッド２ａの吐出口面２ｂがキャッピング部２５ｂに対向した位置に停止するような形状に形成されている。

【００１５】印字面の裏側に配設された紙をガイドする部材であるプラテン２７の裏側に吸収体２８が収納されていて、前記伝動機構部２６により駆動されたポンプユニット２５が排インク管２５ａへ送り出す排インクが排出される。

【００１６】前記排インク吸収体２８は、ポリエステル等の綿状のもの、もしくはスポンジ等の液体を吸収保持するものである。

【００１７】また、前記ポンプユニット２５に接続されている排インク管２５ａは、排インク吸収体２８の内部に適宜長さだけ挿入されている。

【００１８】（実施例１）図１、２に前記インクジェットカートリッジ２をキャリッジ１から取り出した状態の斜視図を示す。図１はインクタンク２ｂを記録ヘッド２ａに取り付ける前の状態、図２はインクタンク２ｂを記録ヘッド２ａに取り付けた状態を示す。

【００１９】インクタンク２ｂから記録ヘッド２ａへインクを供給するインク供給管２ａ１が、インクタンク２ｂのインク供給孔２ｂ４に接合するとき、まずインク供給管２ａ１は開口部２ｂ２に接触する。ここで開口部２ｂ２はインクタンク２ｂ外装のモールドに一体に形成されており環状に薄肉部を設けて破れやすいようにしてある。また、応力が集中するように切り口を斜めにしている。これによってさらにインクタンク２ｂを記録ヘッド２ａに押しつけることによってインク供給管$２ａ_{1}$は薄肉部より開口部$２ｂ_{2}$を破壊し、インクタンクとの連通がなされる。さらにインク供給管$２ａ_{1}$はインクタンク内にインクを収納しているスポンジ$２ｂ_{1}$を押圧する。スポンジ$２ｂ_{1}$を押圧すると毛細管力が増しインク保持力が増加するためインクはインク供給口$２ａ_{2}$に集まり記録ヘッド２ａへのインクの供給が可能となる。そしてインク供給孔$２ｂ_{4}$の入口にはゴムのような弾力性をもったシール部材$２ｂ_{3}$があり、インク供給管$２ａ_{1}$の外周に密着しインクをシールする。これによってインク漏れのない確実な連通を確保することができる。またインク供給管$２ａ_{1}$の径を広げることによって、多量のインク供給量を確保し、高速の印字にも対応することが可能である。

【００２０】なお、開口部に用いられる部材は、弾力性を持ち、十分な強度を持ちながらかつ薄肉部で破れるものでなければならない。このような部材としてポリエチレンやポリプロピレンなどが適当であると思われる。そして薄肉部の厚さは、開口部をシールしうる十分な強度をもち、製作技術の許すかぎり薄いものが好ましい。またインク供給管に使われる部材は、薄肉部を突き破る際、欠損変形しないだけの強度をもち、インクによって腐蝕しにくいものが好ましい。

【００２１】なお本実施例ではシール部材をインクタンク側に備えているが、図５のようにインク供給管にリブ部を設け、そのリブ部によってインクをシールする形状

であっても同様の効果を得られる。

【００２２】（実施例２）次に本発明の第２の実施例として、シール部をインクタンク外装のモールドと一体に形成した場合を示す。図４は本実施例の記録ヘッドとインクタンクを示す概略図でインクタンクは断面で表している。上述と同様の機能を有する各部には、対応箇所に同一符号を付して説明を省略する。

【００２３】インクタンク２ｂは開口部２b_2とともにシール部２b_5を外装のモールドと一体に形成されている。ここでシール部２b_5は図の様に中がくり抜かれたアンダーカット形状になっており、成型は無理抜き等によって行われる。

【００２４】インク供給管２a_1がインク供給孔２b_4に接合すると、シール部２ｂ５は開口部方向に押し込まれた状態でインク供給管２a_1をシールしてインク漏れを防止する。そして本実施例では、開口部に加えシール部材もインクタンクと一体に構成することによって、従来のように別部材を用意する必要がないため、工程数を減らしコストダウンを図ることができる。

【００２５】（実施例３）次に本発明の第３の実施例として、インクタンクの開口部に突起物を設けた場合を示す。図６は本実施例の記録ヘッドとインクタンクを示す斜視図で記録ヘッドは供給管のみをインクタンクは一部を切り欠いて表している。上述と同様の機能を有する各部には対応箇所に同一符号を付して説明を省略する。

【００２６】図６において、本実施例の開口部２b_7に突起物２b_8を設け、インク供給管２a_1がその突起物２b_8に最初に接触して応力がかかるようにしてある。さらに開口部２b_7の薄肉の溝部の形状を突起物２b_7の部分の半径が小さくなるような梨型の形状にすることによって、突起物２b_7の部分に応力が集中するようにしてある。インク供給管２a_1は２a_4部と２a_5部とに分かれており、２a_4部とインクタンク２a_9部とでシールを行う。２a_4部は供給管２a_1が突起物２b_8に接触する前にシールする必要があることから、供給孔２b_4の深さl_2が２a_5部の長さl_1より深くなっている。

【００２７】本実施例では開口部に突起物を設けることによって、開口部の薄肉に応力を集中して、薄肉を破りやすくしてあるため、インクタンク接合時に無理な力を加えなくても、接合が可能なインクタンクを提供することができる。また本実施例では開口部の薄肉の溝部の形状を梨型としたが、円型や楕円型でも同様の効果を得ることができる。

【００２８】なお、本発明は、特にインクジェット記録方式の中でもバブルジェット方式の記録ヘッド、記録装置において優れた効果をもたらすものである。

【００２９】その代表的な構成や原理については、例えば、米国特許第４７２３１２９号明細書、同第４７４０７９６号明細書に開示されている基本的な原理を用いて行うものが好ましい。

【００３０】この方式は所謂オンデマンド型、コンティニュアス型のいずれにも適用可能であるが、特に、オンデマンド型の場合には、液体（インク）が保持されているシートや液路に対応して配置されている電気熱変換体に、記録情報に対応していて核沸騰を越える急速な温度上昇を与える少なくとも１つの駆動信号を印可することによって、電気熱変換体に熱エネルギを発生せしめ、記録ヘッドの熱作用面に膜沸騰を生じさせて、結果的にこの駆動信号に一対一対応した液体（インク）内の気泡を形成できるので有効である。

【００３１】この液体の成長、収縮により吐出用開口を介して液体（インク）を吐出させて、少なくとも１つの滴を形成する。

【００３２】この駆動信号をパルス形状とすると、即時適切に気泡の成長収縮が行われるので、特に応答性に優れた液体（インク）の吐出が達成でき、より好ましい。このパルス形状の駆動信号としては、米国特許第４４６３３５９号明細書、同第４３４５２６２号明細書に記載されているような物が適している。

【００３３】なお、上記熱作用面の温度上昇率に関する発明の米国特許第４３１３１２４号明細書に記載されている条件を採用すると、さらに優れた記録を行うことができる。

【００３４】記録ヘッドの構成としては、上述の各明細書に開示されているような吐出口、液路、電気熱変換体の組合せ構成（直線状液流路または直角液流路）の他に熱作用部が屈曲する領域に配置されている構成を開示する米国特許第４５５８３３３号明細書、米国特許第４４５９６００号明細書を用いた構成も本発明に含まれるものである。加えて、複数の電気熱変換体に対して、共通するスリットを電気熱変換体の吐出部とする構成を開示する特開昭５９－１２３６７０号や熱エネルギの圧力波を吸収する開孔を吐出部に対応させる構成を開示する特開昭５９－１３８４６１号公報に基いた構成としても本発明の効果は有効である。すなわち、記録ヘッドの形態がどのようなものであっても、記録を確実に効率よく行いうるからである。

【００３５】さらに、記録装置が記録できる記録媒体の最大幅に対応した長さを有するフルラインタイプの記録ヘッドに対しても本発明を適用することができる。そのような記録ヘッドとしては、複数記録ヘッドの組合せによってその長さを満たす構成や、一体的に形成された１個の記録ヘッドとしての構成のいずれでもよい。加えて、上例のようなシリアルタイプのものでも記録ヘッドがキャリアに固定されているパーマネントタイプの記録ヘッドを用いた場合にも本発明は有効である。

【００３６】また、搭載されている記録ヘッドの種類ないし個数についても、例えば単色のインクに対応して一個のみが設けられたものの他、記録色や濃度を異にする複数のインクに対応して複数個設けられるものであって

も良い。

【００３７】さらに加えて、本発明のインクジェット記録装置の形態としては、コンピュータ等の情報処理機器の画像出力端末として用いられるものの他、リーダ等と組み合わせた複写装置、さらには送受信機能を有するファクシミリ装置の形態を取るものであっても良い。

【００３８】

【発明の効果】本発明は、以上説明したように、インクタンクの開口部をインクタンクと一体構成とし、開口部を貫通することによって記録ヘッドへのインク供給口が開かれるように構成したので、インク漏れの無いインクカートリッジを提供することができ、また製作工程を減らしコストダウンを計ることができる。

【図面の簡単な説明】

【図１】本発明の第１の実施例のインクジェット記録ヘッドとインクタンクの分離状態を示す斜視図。

【図２】本発明の第１の実施例のインクジェット記録ヘッドとインクタンクの結合状態を示す斜視図。

【図３】本発明の実施例を適用したインクジェット記録装置を示す斜視図。

【図４】本発明の第２の実施例のインクジェット記録ヘッドとインクタンクを示す概略図。

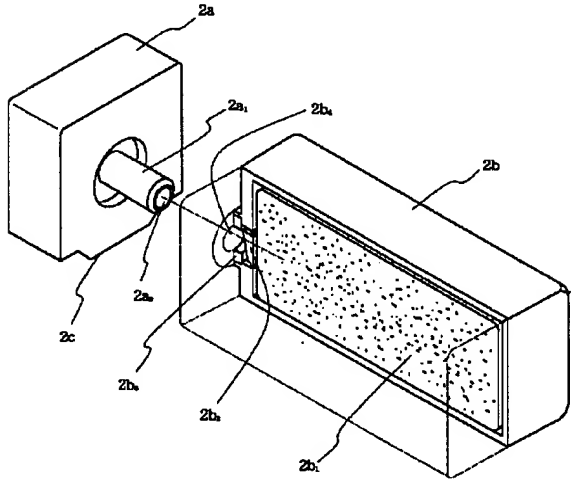
【図５】本発明の第１の実施例のインク供給管にリブ部を設けたインクジェット記録ヘッドとインクタンクを示す概略図。

【図６】本発明の第３の実施例のインクジェット記録ヘッドとインクタンクを示す斜視図。

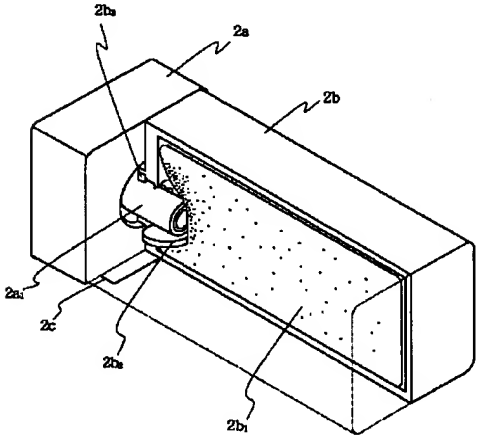
【符号の説明】

１　キャリッジ
２　記録ヘッド
４　リードスクリュー
５　キャリアモータ
８　記録用紙
９　搬送ローラ
１０　ピンチローラ
１１　紙送りモータ
１２　拍車
１３　排紙ローラ
１９　排紙ローラ駆動軸
２０　排紙ローラホルダ
２１　排紙ローラバネ
２２　ピンチローラバネ
２４　リリースアングル
２５　ポンプユニット
２８　排インク吸収体

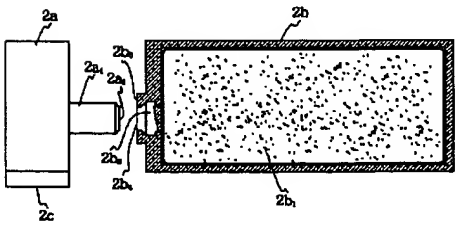
【図１】



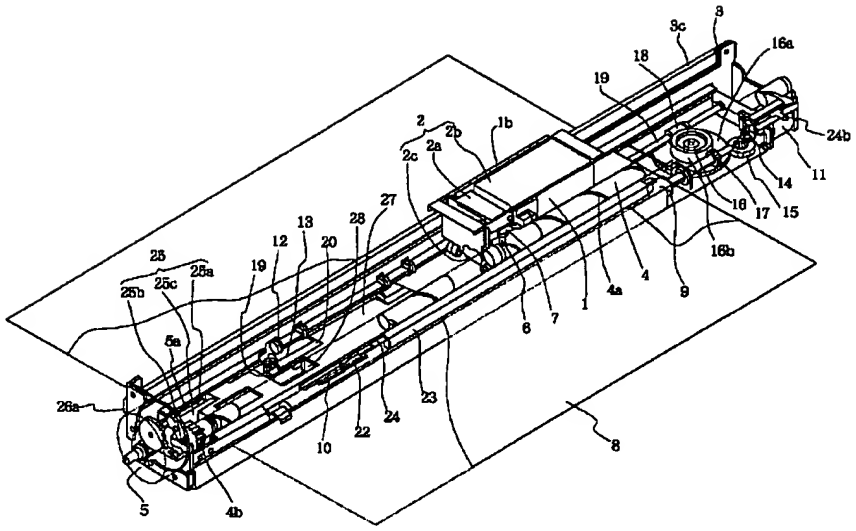
【図２】



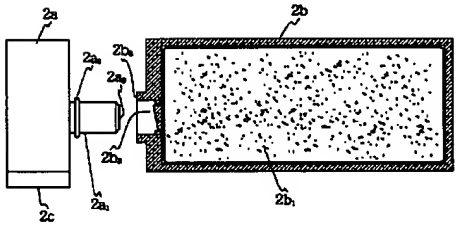
【図４】



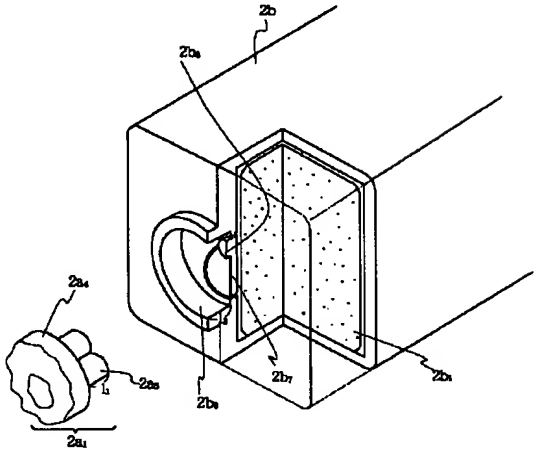
【図３】


3
3c
16a
18
19
2
2b
1b
2a
2c
24b
11
14
16
17
15
16b
25
25a
25b
25c
19
12
13
20
28
27
5a
26a
5
4b
10
22
24
23
6
7
1
4a
4
9
8

【図５】


2a
2b
2a1
2a2
2b2
2a3
2c
2b1

【図６】


2b
2b6
2a4
2a5
2b7
2b8
2b4

* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1] The ink jet recording device which is equipped with the ink tank which connects with a recording head and this recording head in an ink jet recording device, and supplies ink to this recording head, considers opening of this ink tank as the one configuration of an ink tank and said division material, and is characterized by opening the ink feed hopper to this recording head by penetrating opening of this ink tank.
[Claim 2] Opening of said ink tank is an ink jet recording device according to claim 1 characterized by constituting so that a light-gage slot may be prepared and stress may be applied.
[Claim 3] The ink jet recording device according to claim 1 or 2 characterized by considering the seal member of opening of said ink tank as the one configuration of this ink tank and said division material.
[Claim 4] The ink jet recording device according to claim 1 or 2 characterized by paths differing the part of said recording head combined with opening of said ink tank.
[Claim 5] The ink jet recording device according to claim 1 to 4 characterized by constituting so that a projection may be prepared in the light-gage slot of said ink tank and stress may become high.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention makes ink breathe out from the delivery of a recording head, and relates to the ink jet recording apparatus which especially an ink tank detaches and attaches to a direct recording head about the ink jet recording apparatus which records by making this adhere to recorded media.
[0002]
[Description of the Prior Art] The thing excellent in the small lightweight portability called a note type or laptop type in a personal computer or a word processor is proposed in recent years, and the small thing corresponding to it also in a printer is called for. So, when an ink tank is formed in a recording head and one and ink is lost, the ink cartridge of the gestalt exchanged the whole recording head is proposed. However, since the expensive recording head was also simultaneously exchanged compared with the ink tank, this cartridge was not able to say that cost

performance was excellent. this thing -- taking an example -- an ink tank and each recording head -- separation -- the exchangeable ink cartridge is proposed.
[0003]
[Problem(s) to be Solved by the Invention] Although the gestalt which prepared the closure film member which seals ink tank opening and is penetrate for the first time in the ink cartridge of the above-mentioned separation exchange mold at the time of ink feed zone insertion for ink leakage prevention was proposed (refer to JP,63-3959,A) , when it was prolonged preservation , there was a possibility that the adhesives of the joint of the closure film and an ink tank could maintain a sealing condition neither by thermal expansion nor aging , in this case .
[0004] This invention is made in view of the trouble which the above-mentioned conventional technique has, and it aims at offering the ink cartridge which can fully secure a sealing condition also in the case of prolonged preservation.
[0005]
[Means for Solving the Problem] In order to attain the above-mentioned object, opening of an ink tank is considered as the one configuration of an ink tank and said division material, and it is characterized by opening the ink feed hopper to a recording head by penetrating opening of an ink tank.
[0006] Moreover, a part for a thin-walled part is formed in the edge of opening, and it considers as the gestalt which stress is applied and is easy to penetrate.
[0007]
[Example] The example of this invention is explained based on a drawing. Drawing 3 is the perspective view showing the ink jet recording device which applied the example of this invention.
[0008] In drawing 3 , the ink jet cartridge 2 which recording head 2a and ink tank 2b connected is carried in carriage 1. The end section by the side of recording head 2a of this carriage 1 Fitting of the sliding of the shaft orientations is made possible to the leading screw 4 attached in the chassis 3 free [rotation]. To the other end of carriage 1 Guide 1b is arranged. this guide while it is inserted in the shaft orientations of a leading screw 4, and parallel free [sliding] by guide-rail 3c by which 1b was formed in the chassis 3 and the position of carriage 1 is always kept constant to them -- the revolution of a leading screw 4 -- following -- the shaft orientations -- a round trip -- it has movable composition.
[0009] Both-way actuation of said carriage 1 is carried out by the lead pin 6 inserted in said carriage 1 inserted in lead slot 4a which said leading screw 4 engaged with gear 4b which fixed at the end on the left-hand side of [the] a graphic display, and clutch gear 5a which fixed to the output shaft of the carrier motor 5, and was spirally formed in the leading screw 4 in the predetermined pitch with normal rotation and an inversion of actuation of the carrier motor 5. Said lead pin 6 is energized by lead slot 4a of a leading screw 4 with the lead pin spring 7, in order to lose backlash with said leading screw 4.
[0010] Conveyance of the record form 8 which counters delivery side 2c of said recording head 2a is sent as required [to the printing section] by carrying out the pressure welding of said record form 8 to said conveyance roller 9 by the pinch roller 10 which carries out a pressure welding to the conveyance roller 9, and rotating said conveyance roller 9 suitably by the paper feed motor 11. After printing is discharged out of equipment with the delivery roller 13 which carries out a pressure welding to a spur 12 and said spur 12. although actuation of said conveyance roller 9 and the delivery roller 13 was performed by the paper feed motor 11, or

transfer of the driving force was attached in the shaft of said paper feed motor 11 -- mackerel -- it is performed by the motor pinion 14 which consists of a gearing, bulk ****** 15, the worm roller 16, the conveyance wheel 17, and the delivery wheel 18. A hand of cut is changed into a right angle by bulk ****** 15, and the revolution of the motor pinion 14 is told to the worm roller 16 by the spur gear section. The spiral flat-surface worm is formed in the worm roller 16 at partial 16a of the shape of the flange, and actuation of the conveyance (un-illustrating) roller 13 is performed by engaging with the delivery wheel 18 with which the worm (un-illustrating) formed in body 16b of the worm roller 16 was attached in the delivery roller driving shaft 19.
[0011] The location of said spur 12 is immobilization, said delivery roller 13 is held by slot 20a across the delivery roller holder 20, and the pressure welding is carried out with the delivery roller spring 21 so that both said spur 12 and the delivery roller driving shaft 19 may be pushed and hit. Said delivery roller holder 20 is supported so that it may rotate centering on the delivery roller driving shaft 19. Since the delivery roller 13 follows according to the thickness of the record form 8 on the occasion of conveyance of the record form 8, the top face of the record form 8 runs against a spur 12 and the location of the vertical direction is regulated When the record form 8 conveyed as shown in drawing becomes thick, there are few amounts to which the front face of the record form 8 and the distance of delivery side 2c of a recording head become short compared with the case (shown in a two-dot chain line) where a spur moves, and they can be managed with delivery roller location immobilization.
[0012] Capping section 25b to which a recovery device 25 carries out capping of the delivery side 2c of recording head 2a, The pump unit which makes negative pressure the interior of this capping 25b, attracts the ** ink compulsorily discharged from delivery side 2c from capping section 25b, and is sent out to ** ink tubing 25a (it is easy to be the well-known thing which consists of a piston, a cylinder, etc.) It consists of the driving mechanism sections 26 (un-illustrating) which consist of a well-known cam for moving 25c and said capping section 25b to delivery side 2c approximately, and transmitting driving force to said pump-unit 25c, and a gear mechanism. The revolution driving force of the carrier motor 5 is told to said driving mechanism section 26 by clutch gear 5a.
[0013] Baffle means, such as a spline slot, are established, and said clutch gear 5a is attached in the output shaft of the carrier motor 5 possible [sliding of the shaft orientations], and is always energized in the direction of carriage 1 with the spring (un-illustrating). When carriage 1 returns to the recovery location which is a location where delivery side 2c of a recording head 2 faces capping section 25b, it is pressed by the left lateral of a graphic display of carriage 1, and resists and moves to the force of said spring 5b, and this clutch gear 5a gears with timing-gear 26a of said driving mechanism 26, rotates this timing-gear 26a, and tells the revolution driving force of the carrier motor 5 to the driving mechanism section 26.
[0014] Moreover, lead slot 4a of said leading screw 4 is formed in a configuration which is stopped in the location where delivery side 2b of recording head 2a countered capping section 25b while said clutch gear 5a has told the revolution driving force of a leading screw 4.
[0015] The absorber 28 is contained by the background of the platen 27 which is the member which guides the paper arranged in the background of a printing side, and the ** ink which the pump unit 25 driven by said driving mechanism section 26 sends out to ** ink tubing 25a is discharged.
[0016] Said ** ink absorber 28 carries out absorption maintenance of the liquids, such as a thing of the shape of cotton, such as polyester, or sponge.

[0017] Moreover, as for ** ink tubing 25a connected to said pump unit 25, only die length is suitably inserted in the interior of the ** ink absorber 28.
[0018] (Example 1) The perspective view in drawing 1 and the condition of having taken out said ink jet cartridge 2 from carriage 1 to 2 is shown. The condition before drawing 1 attaches ink tank 2b in recording head 2a, and drawing 2 show the condition of having attached ink tank 2b in recording head 2a.
[0019] When the ink supply pipe two a1 which supplies ink to recording head 2a from ink tank 2b joins to ink feed-holes 2b4 of ink tank 2b, the ink supply pipe two a1 contacts opening 2b2 first. Opening 2b2 is formed in the mould of ink tank 2b sheathing here at one, a thin-walled part is prepared annularly, and it is made to have been easy to be torn. Moreover, the cut end is made slanting so that stress may concentrate. By forcing ink tank 2b on recording head 2a further by this, the ink supply pipe two a1 destroys opening 2b2 from a thin-walled part, and a free passage with an ink tank is made. Furthermore, the ink supply pipe two a1 presses sponge 2b1 which has contained ink in an ink tank. Since the capillary tube force will increase and ink holding power will increase if sponge 2b1 is pressed, ink gathers for the ink feed hopper two a2, and the supply of the ink to recording head 2a of it is attained. And there is seal member 2b3 which had resiliency like rubber in the inlet port of ink feed-holes 2b4, it sticks to the periphery of the ink supply pipe two a1, and the seal of the ink is carried out. The positive free passage without ink leakage is securable with this. Moreover, by extending the path of the ink supply pipe two a1, it is possible to secure a lot of ink amount of supply, and to deal also with high-speed printing.
[0020] In addition, the member used for opening must be beaten by the thin-walled part, having resiliency and having sufficient reinforcement. Polyethylene, polypropylene, etc. are considered to be suitable as such a member. And as long as it has sufficient reinforcement which can carry out the seal of the opening and a fabrication technique allows, the thin thing of the thickness of a thin-walled part is desirable. Moreover, in case the member used for an ink supply pipe breaks through a thin-walled part, what has only the reinforcement which does not carry out deficit deformation and cannot **** easily due to ink is desirable.
[0021] In addition, although the ink tank side is equipped with the seal member in this example, the rib section is prepared in an ink supply pipe like drawing 5 , and the same effectiveness can be acquired even if it is the configuration which carries out the seal of the ink by the rib section.
[0022] (Example 2) The case where the seal section is formed in the mould of ink tank sheathing and one is shown as the 2nd example of this invention below. The ink tank expresses in the cross section with the schematic diagram in which drawing 4 shows the recording head and ink tank of this example. To each part which has the same function as ****, the same sign is given to a response part and explanation is omitted.
[0023] Ink tank 2b is formed in the mould of sheathing, and one in seal section 2b5 with opening 2b2. As shown in drawing, as for seal section 2b5, inside is a ********** undercut configuration, and molding is performed by unreasonableness omission etc. here.
[0024] If the ink supply pipe two a1 joins to ink feed-holes 2b4, seal section 2b5 will carry out the seal of the ink supply pipe two a1 in the condition of having been pushed in in the direction of opening, and will prevent ink leakage. And in this example, since it is not necessary to prepare another member like before by constituting a seal member in an ink tank and one in addition to opening, a routing counter can be reduced and a cost cut can be aimed at.
[0025] (Example 3) The case where a projection is prepared in opening of an ink tank is shown as the 3rd example of this invention below. A recording head turns off only a supply pipe and an

ink tank turns off a part, and it lacks and expresses with the perspective view in which drawing 6 shows the recording head and ink tank of this example. The same sign is given to each part which has the same function as **** in a response part, and explanation is omitted.
[0026] Projection 2b8 is formed in opening 2b7 of this example, and the ink supply pipe two a1 contacts the projection 2b8 first, and it is made for stress to be applied in drawing 6 . By furthermore making the configuration of the slot of the thin meat of opening 2b7 into the pear type configuration where the radius of the part of projection 2b7 becomes small, stress is concentrated on the part of projection 2b7. The ink supply pipe two a1 is divided into the two a4 section and the two a5 section, and performs a seal in the two a4 section and the two aink tank 9 section. Since it is necessary to carry out the seal of the two a4 section before a supply pipe two a1 contacts projection 2b8, the depth l2 of feed-holes 2b4 is deeper than the die length l1 of the two a5 section.
[0027] In this example, by preparing a projection in opening, stress is concentrated on the thin meat of opening, and since thin meat is made easy to tear, even if it does not apply the force impossible at the time of ink tank junction, a joinable ink tank can be offered. Moreover, although the configuration of the slot of the thin meat of opening was used as the pear type in this example, the same effectiveness can be acquired also with a circle type or an elliptic type.
[0028] In addition, this invention brings about the effectiveness which was especially excellent in the recording head of Bubble Jet, and the recording device also in the ink jet recording method.
[0029] About the typical configuration and typical principle, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 description and the 4740796 description, for example is desirable.
[0030] Although this method is applicable to both the so-called mold on demand and a continuous system On the electric thermal-conversion object which is especially arranged corresponding to the sheet and liquid route where the liquid (ink) is held in the case of the mold on demand By carrying out the seal of approval of at least one driving signal which gives the rapid temperature rise which supports recording information and exceeds nucleate boiling Since the air bubbles in the liquid (ink) which made the electric thermal-conversion object generate heat energy, and the heat operating surface of a recording head was made to produce film boiling, and carried out the one to one correspondence to this driving signal as a result can be formed, it is effective.
[0031] A liquid (ink) is made to breathe out through opening for regurgitation by growth of this liquid, and contraction, and at least one drop is formed.
[0032] If this driving signal is made into a pulse configuration, since growth contraction of air bubbles will be performed appropriately instancy, the regurgitation of a liquid (ink) excellent in especially responsibility can be attained, and it is more desirable. As a driving signal of this pulse configuration, an object which is indicated by the U.S. Pat. No. 4463359 description and the 4345262 description is suitable.
[0033] In addition, if the conditions indicated by the U.S. Pat. No. 4313124 description of invention about the rate of a temperature rise of the above-mentioned heat operating surface are adopted, further excellent record can be performed.
[0034] As a configuration of a recording head, the configuration using the U.S. Pat. No. 4558333 description and U.S. Pat. No. 4459600 description which indicate the configuration arranged to the field to which the heat operation section other than the combination configuration (a straight-

line-like liquid flow channel or right-angle liquid flow channel) of a delivery which is indicated by each above-mentioned description, a liquid route, and an electric thermal-conversion object is crooked is also included in this invention. In addition, the effectiveness of this invention is effective also as a configuration based on JP,59-138461,A which indicates the configuration whose puncturing which absorbs the pressure wave of JP,59-123670,A which indicates the configuration which uses a common slit as the discharge part of an electric thermal-conversion object to two or more electric thermal-conversion objects, or heat energy is made to correspond to a discharge part. Namely, no matter the gestalt of a recording head may be what thing, it is because it can record efficiently certainly.

[0035] Furthermore, this invention is applicable also to the recording head of the full line type which has the die length corresponding to the maximum width of the record medium which can record a recording device. As such a recording head, any of the configuration which fills the die length with the combination of two or more recording heads, and the configuration as one recording head formed in one are sufficient. In addition, this invention is effective also when the thing of a serial type like the example of a top also uses the recording head of the permanent type with which the recording head is being fixed to the carrier.

[0036] Moreover, although only the piece was prepared also about the class thru/or the number of a recording head carried, for example corresponding to monochromatic ink, more than one may be prepared corresponding to two or more ink which differs in an others and record color or concentration.

[0037] Furthermore, in addition, as a gestalt of the ink jet recording device of this invention, although used as an image printing terminal of information management systems, such as a computer, the gestalt of the reproducing unit combined with others, a reader, etc. and the facsimile apparatus which has a transceiver function further may be taken.

[0038]

[Effect of the Invention] Since this invention was constituted so that the ink feed hopper to a recording head might be opened by an ink tank and really considering opening of an ink tank as a configuration, and penetrating opening as explained above, it can offer an ink cartridge without ink leakage, and can reduce a fabrication process, and can measure a cost cut.

TECHNICAL FIELD

[Industrial Application] This invention makes ink breathe out from the delivery of a recording head, and relates to the ink jet recording apparatus which especially an ink tank detaches and attaches to a direct recording head about the ink jet recording apparatus which records by making this adhere to recorded media.

PRIOR ART

[Description of the Prior Art] The thing excellent in the small lightweight portability called a note type or laptop type in a personal computer or a word processor is proposed in recent years, and the small thing corresponding to it also in a printer is called for. So, when an ink tank is formed in a recording head and one and ink is lost, the ink cartridge of the gestalt exchanged the

whole recording head is proposed. However, since the expensive recording head was also simultaneously exchanged compared with the ink tank, this cartridge was not able to say that cost performance was excellent. this thing -- taking an example -- an ink tank and each recording head -- separation -- the exchangeable ink cartridge is proposed.

EFFECT OF THE INVENTION

[Effect of the Invention] Since this invention was constituted so that the ink feed hopper to a recording head might be opened by an ink tank and really considering opening of an ink tank as a configuration, and penetrating opening as explained above, it can offer an ink cartridge without ink leakage, and can reduce a fabrication process, and can measure a cost cut.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Although the gestalt which prepared the closure film member which seals ink tank opening and is penetrate for the first time in the ink cartridge of the above-mentioned separation exchange mold at the time of ink feed zone insertion for ink leakage prevention was proposed (refer to JP,63-3959,A) , when it was prolonged preservation , there was a possibility that the adhesives of the joint of the closure film and an ink tank could maintain a sealing condition neither by thermal expansion nor aging , in this case .

[0004] This invention is made in view of the trouble which the above-mentioned conventional technique has, and it aims at offering the ink cartridge which can fully secure a sealing condition also in the case of prolonged preservation.

MEANS

[Means for Solving the Problem] In order to attain the above-mentioned object, opening of an ink tank is considered as the one configuration of an ink tank and said division material, and it is characterized by opening the ink feed hopper to a recording head by penetrating opening of an ink tank.

[0006] Moreover, a part for a thin-walled part is formed in the edge of opening, and it considers as the gestalt which stress is applied and is easy to penetrate.

EXAMPLE

[Example] The example of this invention is explained based on a drawing. Drawing 3 is the perspective view showing the ink jet recording device which applied the example of this invention.

[0008] In drawing 3 , the ink jet cartridge 2 which recording head 2a and ink tank 2b connected is carried in carriage 1. The end section by the side of recording head 2a of this carriage 1 Fitting of the sliding of the shaft orientations is made possible to the leading screw 4 attached in the

chassis 3 free [rotation]. To the other end of carriage 1 Guide 1b is arranged. this guide while it is inserted in the shaft orientations of a leading screw 4, and parallel free [sliding] by guide-rail 3c by which 1b was formed in the chassis 3 and the position of carriage 1 is always kept constant to them -- the revolution of a leading screw 4 -- following -- the shaft orientations -- a round trip -- it has movable composition.

[0009] Both-way actuation of said carriage 1 is carried out by the lead pin 6 inserted in said carriage 1 inserted in lead slot 4a which said leading screw 4 engaged with gear 4b which fixed at the end on the left-hand side of [the] a graphic display, and clutch gear 5a which fixed to the output shaft of the carrier motor 5, and was spirally formed in the leading screw 4 in the predetermined pitch with normal rotation and an inversion of actuation of the carrier motor 5. Said lead pin 6 is energized by lead slot 4a of a leading screw 4 with the lead pin spring 7, in order to lose backlash with said leading screw 4.

[0010] Conveyance of the record form 8 which counters delivery side 2c of said recording head 2a is sent as required [to the printing section] by carrying out the pressure welding of said record form 8 to said conveyance roller 9 by the pinch roller 10 which carries out a pressure welding to the conveyance roller 9, and rotating said conveyance roller 9 suitably by the paper feed motor 11. After printing is discharged out of equipment with the delivery roller 13 which carries out a pressure welding to a spur 12 and said spur 12. although actuation of said conveyance roller 9 and the delivery roller 13 was performed by the paper feed motor 11, or transfer of the driving force was attached in the shaft of said paper feed motor 11 -- mackerel -- it is performed by the motor pinion 14 which consists of a gearing, bulk ****** 15, the worm roller 16, the conveyance wheel 17, and the delivery wheel 18. A hand of cut is changed into a right angle by bulk ****** 15, and the revolution of the motor pinion 14 is told to the worm roller 16 by the spur gear section. The spiral flat-surface worm is formed in the worm roller 16 at partial 16a of the shape of the flange, and actuation of the conveyance (un-illustrating) roller 13 is performed by engaging with the delivery wheel 18 with which the worm (un-illustrating) formed in body 16b of the worm roller 16 was attached in the delivery roller driving shaft 19.

[0011] The location of said spur 12 is immobilization, said delivery roller 13 is held by slot 20a across the delivery roller holder 20, and the pressure welding is carried out with the delivery roller spring 21 so that both said spur 12 and the delivery roller driving shaft 19 may be pushed and hit. Said delivery roller holder 20 is supported so that it may rotate centering on the delivery roller driving shaft 19. Since the delivery roller 13 follows according to the thickness of the record form 8 on the occasion of conveyance of the record form 8, the top face of the record form 8 runs against a spur 12 and the location of the vertical direction is regulated When the record form 8 conveyed as shown in drawing becomes thick, there are few amounts to which the front face of the record form 8 and the distance of delivery side 2c of a recording head become short compared with the case (shown in a two-dot chain line) where a spur moves, and they can be managed with delivery roller location immobilization.

[0012] Capping section 25b to which a recovery device 25 carries out capping of the delivery side 2c of recording head 2a, The pump unit which makes negative pressure the interior of this capping 25b, attracts the ** ink compulsorily discharged from delivery side 2c from capping section 25b, and is sent out to ** ink tubing 25a (it is easy to be the well-known thing which consists of a piston, a cylinder, etc.) It consists of the driving mechanism sections 26 (un-illustrating) which consist of a well-known cam for moving 25c and said capping section 25b to delivery side 2c approximately, and transmitting driving force to said pump-unit 25c, and a gear

mechanism. The revolution driving force of the carrier motor 5 is told to said driving mechanism section 26 by clutch gear 5a.
[0013] Baffle means, such as a spline slot, are established, and said clutch gear 5a is attached in the output shaft of the carrier motor 5 possible [sliding of the shaft orientations], and is always energized in the direction of carriage 1 with the spring (un-illustrating). When carriage 1 returns to the recovery location which is a location where delivery side 2c of a recording head 2 faces capping section 25b, it is pressed by the left lateral of a graphic display of carriage 1, and resists and moves to the force of said spring 5b, and this clutch gear 5a gears with timing-gear 26a of said driving mechanism 26, rotates this timing-gear 26a, and tells the revolution driving force of the carrier motor 5 to the driving mechanism section 26.
[0014] Moreover, lead slot 4a of said leading screw 4 is formed in a configuration which is stopped in the location where delivery side 2b of recording head 2a countered capping section 25b while said clutch gear 5a has told the revolution driving force of a leading screw 4.
[0015] The absorber 28 is contained by the background of the platen 27 which is the member which guides the paper arranged in the background of a printing side, and the ** ink which the pump unit 25 driven by said driving mechanism section 26 sends out to ** ink tubing 25a is discharged.
[0016] Said ** ink absorber 28 carries out absorption maintenance of the liquids, such as a thing of the shape of cotton, such as polyester, or sponge.
[0017] Moreover, as for ** ink tubing 25a connected to said pump unit 25, only die length is suitably inserted in the interior of the ** ink absorber 28.
[0018] (Example 1) The perspective view in drawing 1 and the condition of having taken out said ink jet cartridge 2 from carriage 1 to 2 is shown. The condition before drawing 1 attaches ink tank 2b in recording head 2a, and drawing 2 show the condition of having attached ink tank 2b in recording head 2a.
[0019] When the ink supply pipe two a1 which supplies ink to recording head 2a from ink tank 2b joins to ink feed-holes 2b4 of ink tank 2b, the ink supply pipe two a1 contacts opening 2b2 first. Opening 2b2 is formed in the mould of ink tank 2b sheathing here at one, a thin-walled part is prepared annularly, and it is made to have been easy to be torn. Moreover, the cut end is made slanting so that stress may concentrate. By forcing ink tank 2b on recording head 2a further by this, the ink supply pipe two a1 destroys opening 2b2 from a thin-walled part, and a free passage with an ink tank is made. Furthermore, the ink supply pipe two a1 presses sponge 2b1 which has contained ink in an ink tank. Since the capillary tube force will increase and ink holding power will increase if sponge 2b1 is pressed, ink gathers for the ink feed hopper two a2, and the supply of the ink to recording head 2a of it is attained. And there is seal member 2b3 which had resiliency like rubber in the inlet port of ink feed-holes 2b4, it sticks to the periphery of the ink supply pipe two a1, and the seal of the ink is carried out. The positive free passage without ink leakage is securable with this. Moreover, by extending the path of the ink supply pipe two a1, it is possible to secure a lot of ink amount of supply, and to deal also with high-speed printing.
[0020] In addition, the member used for opening must be beaten by the thin-walled part, having resiliency and having sufficient reinforcement. Polyethylene, polypropylene, etc. are considered to be suitable as such a member. And as long as it has sufficient reinforcement which can carry out the seal of the opening and a fabrication technique allows, the thin thing of the thickness of a thin-walled part is desirable. Moreover, in case the member used for an ink supply pipe breaks

through a thin-walled part, what has only the reinforcement which does not carry out deficit deformation and cannot **** easily due to ink is desirable.
[0021] In addition, although the ink tank side is equipped with the seal member in this example, the rib section is prepared in an ink supply pipe like drawing 5 , and the same effectiveness can be acquired even if it is the configuration which carries out the seal of the ink by the rib section.
[0022] (Example 2) The case where the seal section is formed in the mould of ink tank sheathing and one is shown as the 2nd example of this invention below. The ink tank expresses in the cross section with the schematic diagram in which drawing 4 shows the recording head and ink tank of this example. To each part which has the same function as ****, the same sign is given to a response part and explanation is omitted.
[0023] Ink tank 2b is formed in the mould of sheathing, and one in seal section 2b5 with opening 2b2. As shown in drawing, as for seal section 2b5, inside is a ********** undercut configuration, and molding is performed by unreasonableness omission etc. here.
[0024] If the ink supply pipe two a1 joins to ink feed-holes 2b4, seal section 2b5 will carry out the seal of the ink supply pipe two a1 in the condition of having been pushed in in the direction of opening, and will prevent ink leakage. And in this example, since it is not necessary to prepare another member like before by constituting a seal member in an ink tank and one in addition to opening, a routing counter can be reduced and a cost cut can be aimed at.
[0025] (Example 3) The case where a projection is prepared in opening of an ink tank is shown as the 3rd example of this invention below. A recording head turns off only a supply pipe and an ink tank turns off a part, and it lacks and expresses with the perspective view in which drawing 6 shows the recording head and ink tank of this example. The same sign is given to each part which has the same function as **** in a response part, and explanation is omitted.
[0026] Projection 2b8 is formed in opening 2b7 of this example, and the ink supply pipe two a1 contacts the projection 2b8 first, and it is made for stress to be applied in drawing 6 . By furthermore making the configuration of the slot of the thin meat of opening 2b7 into the pear type configuration where the radius of the part of projection 2b7 becomes small, stress is concentrated on the part of projection 2b7. The ink supply pipe two a1 is divided into the two a4 section and the two a5 section, and performs a seal in the two a4 section and the two aink tank 9 section. Since it is necessary to carry out the seal of the two a4 section before a supply pipe two a1 contacts projection 2b8, the depth l2 of feed-holes 2b4 is deeper than the die length l1 of the two a5 section.
[0027] In this example, by preparing a projection in opening, stress is concentrated on the thin meat of opening, and since thin meat is made easy to tear, even if it does not apply the force impossible at the time of ink tank junction, a joinable ink tank can be offered. Moreover, although the configuration of the slot of the thin meat of opening was used as the pear type in this example, the same effectiveness can be acquired also with a circle type or an elliptic type.
[0028] In addition, this invention brings about the effectiveness which was especially excellent in the recording head of Bubble Jet, and the recording device also in the ink jet recording method.
[0029] About the typical configuration and typical principle, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 description and the 4740796 description, for example is desirable.
[0030] Although this method is applicable to both the so-called mold on demand and a continuous system On the electric thermal-conversion object which is especially arranged

corresponding to the sheet and liquid route where the liquid (ink) is held in the case of the mold on demand By carrying out the seal of approval of at least one driving signal which gives the rapid temperature rise which supports recording information and exceeds nucleate boiling Since the air bubbles in the liquid (ink) which made the electric thermal-conversion object generate heat energy, and the heat operating surface of a recording head was made to produce film boiling, and carried out the one to one correspondence to this driving signal as a result can be formed, it is effective.

[0031] A liquid (ink) is made to breathe out through opening for regurgitation by growth of this liquid, and contraction, and at least one drop is formed.

[0032] If this driving signal is made into a pulse configuration, since growth contraction of air bubbles will be performed appropriately instancy, the regurgitation of a liquid (ink) excellent in especially responsibility can be attained, and it is more desirable. As a driving signal of this pulse configuration, an object which is indicated by the U.S. Pat. No. 4463359 description and the 4345262 description is suitable.

[0033] In addition, if the conditions indicated by the U.S. Pat. No. 4313124 description of invention about the rate of a temperature rise of the above-mentioned heat operating surface are adopted, further excellent record can be performed.

[0034] As a configuration of a recording head, the configuration using the U.S. Pat. No. 4558333 description and U.S. Pat. No. 4459600 description which indicate the configuration arranged to the field to which the heat operation section other than the combination configuration (a straight-line-like liquid flow channel or right-angle liquid flow channel) of a delivery which is indicated by each above-mentioned description, a liquid route, and an electric thermal-conversion object is crooked is also included in this invention. In addition, the effectiveness of this invention is effective also as a configuration based on JP,59-138461,A which indicates the configuration whose puncturing which absorbs the pressure wave of JP,59-123670,A which indicates the configuration which uses a common slit as the discharge part of an electric thermal-conversion object to two or more electric thermal-conversion objects, or heat energy is made to correspond to a discharge part. Namely, no matter the gestalt of a recording head may be what thing, it is because it can record efficiently certainly.

[0035] Furthermore, this invention is applicable also to the recording head of the full line type which has the die length corresponding to the maximum width of the record medium which can record a recording device. As such a recording head, any of the configuration which fills the die length with the combination of two or more recording heads, and the configuration as one recording head formed in one are sufficient. In addition, this invention is effective also when the thing of a serial type like the example of a top also uses the recording head of the permanent type with which the recording head is being fixed to the carrier.

[0036] Moreover, although only the piece was prepared also about the class thru/or the number of a recording head carried, for example corresponding to monochromatic ink, more than one may be prepared corresponding to two or more ink which differs in an others and record color or concentration.

[0037] Furthermore, in addition, as a gestalt of the ink jet recording device of this invention, although used as an image printing terminal of information management systems, such as a computer, the gestalt of the reproducing unit combined with others, a reader, etc. and the facsimile apparatus which has a transceiver function further may be taken.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The perspective view showing the separation condition of the ink jet recording head of the 1st example of this invention, and an ink tank.

[Drawing 2] The perspective view showing the ink jet recording head of the 1st example of this invention, and the integrated state of an ink tank.

[Drawing 3] The perspective view showing the ink jet recording device which applied the example of this invention.

[Drawing 4] The schematic diagram showing the 2nd ink jet recording head and ink tank of an example of this invention.

[Drawing 5] The schematic diagram showing the ink jet recording head which prepared the rib section, and an ink tank in the ink supply pipe of the 1st example of this invention.

[Drawing 6] The perspective view showing the 3rd ink jet recording head and ink tank of an example of this invention.

[Description of Notations]

1 Carriage
2 Recording Head
4 Leading Screw
5 Carrier Motor
8 Record Form
9 Conveyance Roller
10 Pinch Roller
11 Paper Feed Motor
12 Spur
13 Delivery Roller
19 Delivery Roller Driving Shaft
20 Delivery Roller Holder
21 Delivery Roller Spring
22 Pinch Roller Spring
24 Release Angle Type
25 Pump Unit
28 ** Ink Absorber